Research Paper

Analysis Study Proportion of Labour Wages on Road Development Project in Indonesia

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ABSTRACT

In a construction project, determining the amount of cost proportion to the resource should be precise. This research aims to analyze the proportion of labor wages, identifying the relationship between labor wage costs to contract value and model the proportion of these resources so that they can be used as a reference. The research variables consist of workers wage costs (X_1), the artisan's wage cost (X_2), and the cost of the wage (X_3), each determined by the proportion of the value of the project. From the results of data collection, the proportion of the use of cost for workers is 0.27%-4.34%, the cost of the handyman is 0.1%-1.07% and the cost for the foreman amounted to 0.1%-3.91%. Based on a simple regression analysis the most influential variable on the contract value is the cost of worker's wages with a value of R^2 of 12.3%. The result of a regression analysis indicates that any increase in labor cost variables will be followed by increased contract value. From the results of the analysis, produced a mathematical model of $Y = 0274 X_1 + 0079 X_2 + 0097 X_3$.

1. Introduction

The project is defined as a series of activities undertaken within a limited time using certain resources in hopes of obtaining the best results in the future. In a construction work project, resources are a defining factor in the project's success. Construction projects have the purpose of creating civil buildings with constraints in the form of cost, quality and time. Constraints above must be fulfilled to guarantee the financial gain for the contractor, achievement of quality and duration according to specifications expected by the owner and onsultant supervisor (Ervianto, 2015).

In a construction project, determining the amount of cost proportion for the existing job type should be quite precise especially in road construction that has a wide range of components (Martono, 2019). Project planners need a precise and accurate method of analyzing the proportion of the desired composition Things to call should be implemented in the initial planning before the construction period begins so that needs to be done a detailed study of the financing factors, related to the composition of resources such as labor wage.

From the background of the problem, it is necessary that a study capable of giving a picture of the influence of the proportion of resources in a construction project, which can be used as a reference in the calculation of the right proportions. The aim of the study is analyzing the

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Note: Discussion on this paper is open until Dec 2021.

proportion of wage labor on a sample road construction development project. Identifying the relationship between the value of contract with the need for labor wages. Model the relationship between the contract value and the cost of labor wages.

2.   Review of The Library

2.1   Construction projects

Construction project is a series of activities that are carried out in a period and generally short term. In the series of activities, there is a process that processes the project resources into a result of activities that are in the form of buildings. In the process of completion, it must match the specified specifications, according to the time schedule, and according to the planned cost (Ervianto, 2005).

2.2   Road Construction

Road Construction is a work construction include the creation/opening of a new road according to expected traffic requirements and referring to the technical standard of the road with a plan life of at least 10 years. This development work does not involve the liberation/problems of land and/or that crosses the protected forest.

2.3   Project Cost Budget

The cost budget of a project is to calculate the amount of costs required for the materials and wages of labor based on analysis, as well as other costs associated with the implementation of the work or project.

2.4   Labor Wages

In LAW No. 13 of 2003 provides an understanding of the wage that is the right of workers/workers received and expressed in the form of money in exchange for employers or employers to workers/workers who are stipulated and paid in accordance with employment agreements, agreements, or legislation.

3.   Research Methods

In this research, the data used is the road development project data in Indonesia, where the items of the work consist of public works, drainage work, earthwork, grain pavement, asphalt, and structure work. So it can be said that the data of the road development project that will be processed is a similar project data name from the similarity of the work items. Research conducted in Makassar City, South Sulawesi by analyzing the contract Documents of 21 road construction projects from the Ministry of Public Housing and people's housing to get a proportion of labor costs on road construction projects.

Based on the previous library studies the dependent and independent variables used in this study can be seen in the following table:

Table 1. Variable Research

Dependent Variable	Independent Variable	Symbol
Project Value (Y)	Worker Costs	X_1
	Handyman Costs	X_2
	Foreman Costs	X_3

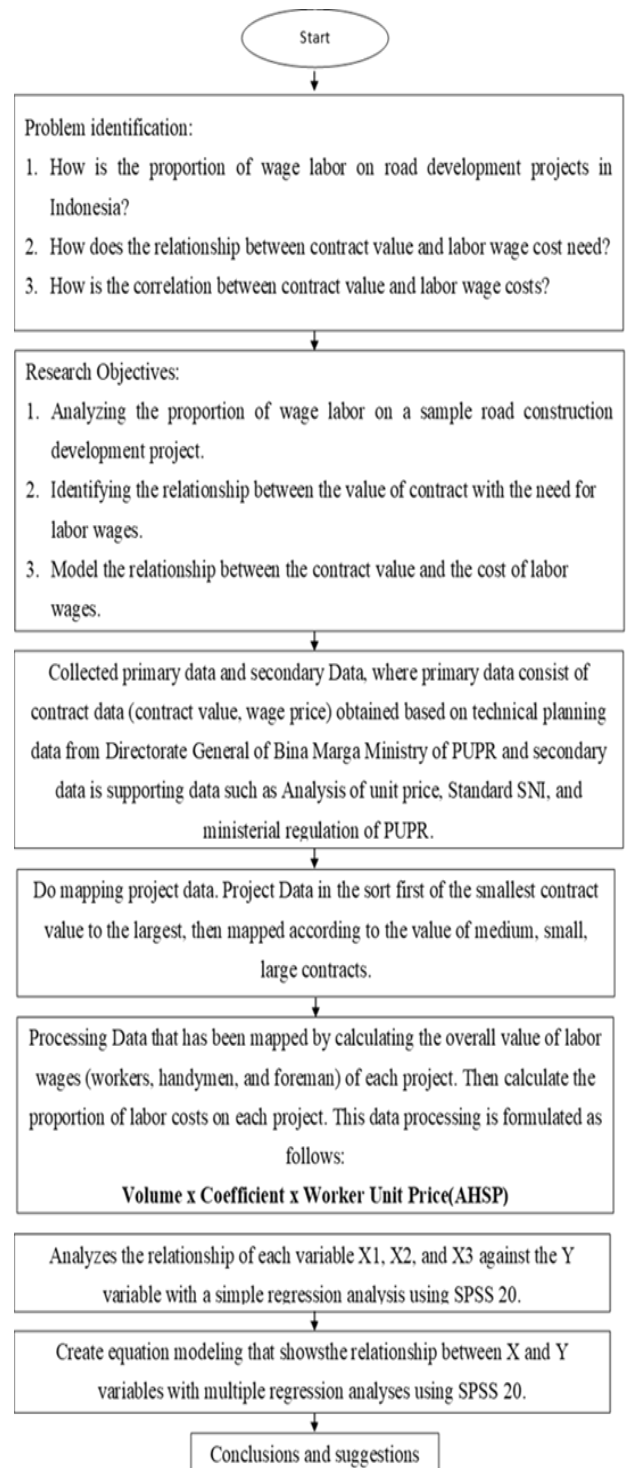Following steps in this research are :

Fig 1. Research flows

4. Results and Discussion

4.1 Research Data

Data collection is done by analyzing the number of workers in the implementation of the road construction projects in particular on the number of field workers, the data on this road project obtained from the Directorate General of the PUPR Ministry. Data collection is conducted by analyzing several documents including,

Table 2. Data and Sourcing Needs

No	Data needs	Source
1.	Budget plan	Project Report Document
2.	Job Volume	Project Report Document
2.	List of wage price analysis	Project Report Document
3.	Job Unit Price Analysis	Project Report Document
4.	Project Contract Value	Document contracts
5.	Implementation method	Project Report Document

The following tabulation of labor wage cost calculation data of each road construction project:

Table 3. Research Data

No.	Project Code	Contract Value(Rp)	Resource Costs (Rp)		
			Worker	Handyman	Foreman
1	P1	41,109,369,000.00	1,162,063,191.21	96,819,220.71	374,496,270.12
2	P2	42,629,351,000.00	1,189,314,127.86	300,936,475.85	223,397,591.04
3	P3	46,063,000,000.00	1,589,501,205.06	289,114,327.38	1,799,204,717.04
4	P4	46,524,678,000.00	344,465,404.49	83,124,796.28	48,299,889.25
5	P5	47,586,458,000.00	634,933,975.74	209,824,047.84	178,857,873.72
6	P6	51,012,000,000.00	424,023,673.25	83,886,082.18	87,036,222.00
7	P7	51,297,416,000.00	1,306,317,875.60	172,844,915.24	294,939,155.66
8	P8	56,316,057,000.00	150,700,531.43	30,443,018.08	42,206,623.76
9	P9	56,672,800,000.00	1,256,022,173.85	186,012,648.99	618,729,829.90
10	P10	57,395,620,000.00	2,492,984,538.27	10,769,054.33	1,124,359,941.96
11	P11	57,687,836,000.00	646,798,211.00	617,367,740.06	115,240,247.67
12	P12	58,123,880,000.00	202,986,743.76	62,798,355.00	43,671,991.26
13	P13	62,162,814,000.00	268,972,545.69	72,537,785.62	60,750,922.60
14	P14	65,811,918,000.00	674,411,774.87	99,362,786.79	158,066,420.63
15	P15	66,159,358,000.00	2,605,083,449.61	9,965,393.09	1,179,969,874.60
16	P16	66,953,000,000.00	1,858,487,613.16	69,508,825.77	696,303,947.16
17	P17	70,147,184,000.00	1,703,763,918.76	82,033,419.20	630,952,833.24
18	P18	72,650,619,000.00	1,122,008,589.73	594,324,071.37	135,844,871.85
19	P19	75,169,069,000.00	2,716,612,530.90	689,404,871.82	737,847,766.72
20	P20	80,046,816,000.00	1,192,028,052.04	4,157,448.98	1,657,541,106.12
21	P21	86,976,434,000.00	1,565,368,538.86	171,737,685.33	634,850,753.64

In this analysis field workers are grouped into three groups: worker, artisan, and Mandor. Furthermore, analyzing the use of budget for financing groups of labor, analysis is done in a descriptive to know the magnitude of the proportion for each workforce on each sample project.

4.2 Results

Based on the project data on table 3, calculation of labor wage proportion in the construction project sample is as follows:

Table 4. Calculate Range Proportion

Project Code	Contract Value (Rp)	Proportion Labor Wages		
		Worker	Handyman	Foreman
P1	41,109,369,000.00	2.83%	0.24%	0.91%
P2	42,629,351,000.00	2.79%	0.71%	0.52%
P3	46,063,000,000.00	3.45%	0.63%	3.91%
P4	46,524,678,000.00	0.74%	0.18%	0.10%
P5	47,586,458,000.00	1.33%	0.44%	0.38%
P6	51,012,000,000.00	0.83%	0.16%	0.17%
P7	51,297,416,000.00	2.55%	0.34%	0.57%
P8	56,316,057,000.00	0.27%	0.05%	0.07%
P9	56,672,800,000.00	2.22%	0.33%	1.09%
P10	57,395,620,000.00	4.34%	0.02%	1.96%
P11	57,687,836,000.00	1.12%	1.07%	0.20%
P12	58,123,880,000.00	0.35%	0.11%	0.08%
P13	62,162,814,000.00	0.43%	0.12%	0.10%
P14	65,811,918,000.00	1.02%	0.15%	0.24%
P15	66,159,358,000.00	3.94%	0.02%	1.78%
P16	66,953,000,000.00	2.78%	0.10%	1.04%
P17	70,147,184,000.00	2.43%	0.12%	0.90%
P18	72,650,619,000.00	1.54%	0.82%	0.19%
P19	75,169,069,000.00	3.61%	0.92%	0.98%
P20	80,046,816,000.00	1.49%	0.01%	2.07%
P21	86,976,434,000.00	1.80%	0.20%	0.73%
Range Proportion		0.27% - 4.34%	0.01% - 1.07%	0.1% - 3.91%

From a sample of the project analyzed as many as 21 road construction projects, it can be known how the average proportion of labor wages cost. On road construction project with the classification of the project's middle class value (10 – 100 M) obtained the proportion of wages of workers at 0.27%-4.34% of the contract value, the proportion of wages of the artisan at 0.01%-1.07% of the contract value and the proportion of the wage fee of 0.1%-3.91% of the contract value. It can be seen that at the wages of workers produce a greater range of proportions when compared with the wages of the handyman and foreman, it is in because on the wages of workers have a considerable coefficient and the price of the wages is also greater. To analyze the effect relation of variable wages of workers, handyman's wages, and the wage foreman on the contract value on this road construction project using a single regression. Out of the three partial correlation analyses in each variable to the contract value, the model of the equation is obtained as in the following table.

Table 5. Effect of variables on contract value

No.	Variabel	R^2
1.	Worker's Wage	0.123
2.	Handyman's Wage	0.012
3	Foreman's Wage	0.073

The results showed that donations were effected by workers wages to the contract value of only 12.3%. effect of the artisan's wages to the contract value is only 1.2% and the effect of the wage was to a contract value of 7.3%. The relationship between the contract value and the needs of workers, builders, and foreman on road construction projects. To figure out the relationship impact of the entire independent variable i.e. workers wages costs (X1), handyman wage costs (X2), and the cost of foreman (X3) against dependent variables such as contract value, the analysis uses multiple regression methods. This is done in addition to knowing the relationship between these variables with contract value will also be known how to modeling Y. Analysis and modeling through the analysis of the double regression using the help of SPSS program. In detail the results of regression analysis can be seen in the following table:

Table 6. Multiple Regression Analysis Test Results

No.	Variabel	Koef. Regresi (Beta)
1	Worker's Wage	0.274
2	Handyman's Wag	0.079
3	Foreman's Wage	0.097

Based on the table above can be obtained regression equation model as follows:

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

$$Y = 0274\ X1 + 0079\ X2 + 0097\ X3$$

Variable regression coefficient of workers wages cost (X1) is 0.274 means that if the cost of workers is increased by 1 unit, the contract value is also increased by 0.274 units. Coefficient of positive value means there is a direct relationship between workers wages cost and contract value. This suggests that any increase in the wage cost of workers, will be followed by an increase in the value of construction contracts. Variable regression coefficient of handyman's wage cost (X2) is 0.079 means that if the cost of the artisan is upgraded 1 unit, then the contract value also increased by 0.079 units. Coefficient of positive value means there is a direct relationship between the handyman's wage fee and the contract value. This suggests that any increase in the cost of artisan wages, will be followed by an increase in the value of construction contracts. Variable regression coefficient of wage cost foreman (X3) is 0.097 means if the cost of the wage was increased by 1 unit, the contract value also increased by 0.097 units. Coefficient of positive value means there is a direct relationship between the cost of foreman wage and contract value. This suggests that any increase in wage costs foreman, will be followed by an increase in the value of construction contracts.

5. Conclusions and Suggestions

Based on the analysis and discussion of the data outlined in Chapter 4, the research conclusions are the result of 21 samples of road construction project data obtaining the proportion of wages of workers was 0.27%-4.34%, the proportion of the handyman wages amounted to 0.1%-1.07% and the proportion of wage foreman amounted to 0.1%-3.91%. From the results of simple regression analysis using SPSS indicates that the value of R^2 for each of the variables is positive value which means that any increase in the cost variable of the wages of workers, handyman and foreman will be followed by an increase in the contract value. The results of the analysis showed that the most influential variables on the contract value were the wages of workers with a presentation value of 12.3%. From the results of multiple regression analysis using SPSS to issue mathematical modeling are:

$$Y = 0274\ X1 + 0079\ X2 + 0097\ X3$$

Where:

X1 = Worker's Wage (X1)

X2 = Handyman's Wage (X2)

X3 = Foreman's Wage(X3)

Y   = Contract Value (Y)

From the mathematical models above can be deduced if at the cost of wages workers, handyman and foreman increased 1 unit, then the contract value also increased the amount of coefficients that owned each for workers, handyman and foreman based on the results modeling regression equation.

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Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No. 07/PRT/M/2019 Standar dan Pedoman Pengadaan Jasa Konstruksi Melalui Penyedia.